

AMENDMENTS TO THE CLAIMS

1. (Currently Amended): An LCD device including an EM type touch panel comprising:
an LCD panel having first and second substrates facing each other, and
a liquid crystal layer between the first and second substrates;
an EM sensor having first and second coil arrays formed of a transparent electrode, the EM sensor integrated with any one of the first and second substrates in the LCD panel, wherein each of the first and second coil arrays include a plurality of coils, and each of the plurality of coils has first and second open ends; and
a backlight unit below the LCD panel.
2. (Original): The LCD device of claim 1, further comprising a controller for controlling the EM sensor below the backlight unit.
3. (Original): The LCD device of claim 1, wherein the first coil array is perpendicular to the second coil array.
4. (Original): The LCD device of claim 1, wherein the EM sensor is on an outer surface of any one of the first and second substrates.
5. (Original): The LCD device of claim 4, wherein the EM sensor includes an adhesive layer on a surface opposite to the LCD panel.
6. (Original): The LCD device of claim 1, wherein the EM sensor is on an inner surface of any one of the first and second substrates.
7. (Currently Amended): The LCD device of claim 1, wherein the EM sensor includes:
a transparent substrate, wherein the first coil array is on the transparent substrate;
a first transparent insulating layer on an entire surface of the transparent substrate including the first coil array, wherein the second coil array is on the first transparent insulating layer; and
a second transparent insulating layer on the first transparent insulating layer including the second coil array.

8. (Cancelled)

9. (Currently Amended): The LCD device of claim 1 [[8]], wherein the first open end is electrically connected to a grounding voltage.

10. (Original): The LCD device of claim 9, wherein the second open end is electrically connected to a MUX.

11. (Original): The LCD device of claim 10, wherein one of the plurality of coils is selected, and then a voltage from the MUX is applied to the selected coil.

12. (Original): The LCD device of claim 7, wherein the transparent electrode includes oxide indium, oxide tin, oxide zinc, indium-tin-oxide, tin-antimony-oxide or indium-zinc-oxide.

13. (Currently Amended): An LCD device including an EM type touch panel comprising:
an LCD panel having first and second substrates facing each other and a liquid crystal layer between the first and second substrates;
a first polarizing plate on an outer surface of the first substrate;
a second polarizing plate on an outer surface of the second substrate; an EM sensor having first and second coil arrays formed of a transparent electrode, the EM sensor integrated with any one of the first and second polarizing plates, wherein each of the first and second coil arrays include a plurality of coils, and each of the plurality of coils has first and second open ends; and
a backlight unit below the LCD panel.

14. (Original): The LCD device of claim 13, further comprising a controller for controlling the EM sensor below the backlight unit.

15. (Original): The LCD device of claim 13, wherein the first coil array is perpendicular to the second coil array.

16. (Original): The LCD device of claim 13, further comprising film-type adhesive layers between inner surfaces of the first and second polarizing plates and outer surfaces of the first and second substrates.

17. (Original): The LCD device of claim 16, wherein the EM sensor is on an outer surface of any one of the first and second polarizing plates.

18. (Original): The LCD device of claim 17, wherein the EM sensor includes an adhesive layer on a surface opposite to the first or second polarizing plate.

19. (Original): The LCD device of claim 16, wherein the EM sensor is between the LCD panel and the first or second polarizing plate.

20. (Original): The LCD device of claim 19, wherein the EM sensor further includes an adhesive layer on a surface opposite to the LCD panel.

21. (Currently Amended): The LCD device of claim 13, wherein the EM sensor includes:
a transparent substrate, wherein the first coil array is on the transparent substrate including the first coil array;
a first transparent insulating layer on an entire surface of the transparent substrate, wherein the second coil array is on the first transparent insulating layer; and
a second transparent insulating layer on the first transparent insulating layer including the second coil array.

22. (Cancelled)

23. (Currently Amended): The LCD device of claim 13 [[22]], wherein the first open end is electrically connected to a ground voltage.

24. (Original): The LCD device of claim 23, wherein the second open end is electrically connected to a MUX.

25. (Original): The LCD device of claim 24, wherein one of the plurality of coils is selected, and then a voltage from the MUX is applied to the selected coil.

26. (Original): The LCD device of claim 21, wherein the transparent electrode includes oxide indium, oxide tin, oxide zinc, indium-tin-oxide, tin-antimony-oxide or indium-zinc-oxide.

27. (Original): The LCD device of claim 21, wherein the transparent substrate includes any one of Polyethylene Terephthalate, Polypropylene Terephthalate, Polyethylene-2, 6-Naphtalate, Syndiotactic, Polystyrene, Norbornene-group polymer, Polycarbonate and Polyarylate.

28. (Currently Amended): An LCD device including an EM type touch panel comprising:
first and second substrates facing each other;
a thin film transistor array on the first substrate;
a plurality of pixel electrodes electrically connected to respective thin film transistors of the thin film transistor array;
an EM sensor including first and second coil arrays formed of a transparent electrode on the second substrate, wherein each of the first and second coil arrays include a plurality of coils, and each of the plurality of coils has first and second open ends;
a color filter layer on the EM sensor corresponding to the pixel electrodes;
an overcoat layer on the color filter layer;
a common electrode on the overcoat layer;
a liquid crystal layer between the first and second substrates; and
a backlight unit below the first substrate.

29. (Original): The LCD device of claim 28, further comprising a light-shielding layer between the EM sensor and the color filter layer and a controller below the backlight unit for controlling the EM sensor.

30. (Currently Amended): The LCD device of claim 28, wherein the EM sensor includes:
a first transparent insulating layer over [[on]] the first coil array including the second substrate ~~the color filter layer~~, wherein the first coil array is formed on the second substrate ~~first transparent insulating layer~~ and

a second transparent insulating layer over ~~[[on]]~~ the first transparent insulating layer including the second coil array ~~the first coil array~~, wherein the second coil array is formed on the first ~~[[second]]~~ transparent insulating layer.

31. (Original): The LCD device of claim 30, wherein the first and second transparent insulating layers are formed of organic layers.

32. (Original): The LCD device of claim 31, wherein the organic layer includes PhotoAcryl, BenzoCycloButen BCB or Polyamide compound.

33. (Cancelled)

34. (Currently Amended): The LCD device of claim 28 ~~[[33]]~~, wherein the first open end is electrically connected to a grounding voltage.

35. (Original): The LCD device of claim 34, wherein the second open end is electrically connected to a MUX.

36. (Original): The LCD device of claim 35 wherein one of the plurality of coils is selected, and then a voltage from the MUX is applied to the selected coil.

37. (Original): The LCD device of claim 28, wherein the transparent electrode includes any one of oxide indium, oxide tin, oxide zinc, indium-tin-oxide, tin-antimony-oxide and indium-zinc-oxide.

38. (Original): The LCD device of claim 28, wherein the overcoat layer is formed of an organic layer.

39. (Original): The LCD device of claim 38, wherein the organic layer includes any one of PhotoAcryl, BenzoCycloButen BCB and Polyamide.

40. (Currently Amended): An LCD device including an EM type touch panel comprising:

first and second substrates facing each other;
a plurality of pixel regions on the first substrate, each pixel region including a thin film transistor, pixel electrode, and a common electrode;
a color filter layer on the second substrate corresponding to the plurality of pixel regions;
an EM sensor including first and second coil arrays formed of a transparent electrode on the color filter layer, wherein each of the first and second coil arrays include a plurality of coils, and each of the plurality of coils has first and second open ends;
an overcoat layer on the EM sensor;
a liquid crystal layer between the first and second substrates; and
a backlight unit below the first substrate.

41. (Original): The LCD device of claim 40, further comprising a light-shielding layer on the second substrate below the color filter layer and a controller below the backlight unit for controlling the EM sensor.

42. (Currently Amended): The LCD device of claim 40, wherein the EM sensor includes:
a first transparent insulating layer over [[on]] the color filter layer including the first coil array, wherein the first coil array is formed on the color filter layer ~~first transparent insulating layer~~; and
a second transparent insulating layer over [[on]] the first transparent insulating layer including the second [[first]] coil array, wherein the second coil array is formed on the first [[second]] transparent insulating layer.

43. (Original): The LCD device of claim 42, wherein the first and second transparent insulating layers are formed of organic layers.

44. (Original): The LCD device of claim 43, wherein the organic layer includes PhotoAcryl, BenzoCycloButen BCB or Polyamide compound.

45. (Cancelled)

46. (Currently Amended): The LCD device of claim 40 [[45]], wherein the first open end is

electrically connected to a grounding voltage.

47. (Original): The LCD device of claim 46, wherein the second open end is electrically connected to a MUX.

48. (Original): The LCD device of claim 47, wherein one of the plurality of coils is selected, and then a voltage from the MUX is applied to the selected coil.

49. (Original): The LCD device of claim 40, wherein the transparent electrode includes any one of oxide indium, oxide tin, oxide zinc, indium-tin-oxide, tin-antimony-oxide and indium-zinc-oxide.

50. (Currently Amended): An LCD device including an EM type touch panel comprising:
first and second substrates facing each other; a thin film transistor array on the first substrate;
a plurality of pixel electrode electrically connected to respective thin film transistors of the thin film transistor array;
an insulating layer on the first substrate;
an EM sensor including first and second coil arrays formed of a transparent electrode on the insulating layer, wherein each of the first and second coil arrays include a plurality of coils, and each of the plurality of coils has first and second open ends;
a color filter layer on the second substrates;
a liquid crystal layer between the first and second substrates; and
a backlight unit below the first substrate.

51. (Original): The LCD device of claim 50, further comprising a common electrode on any one of the first and second substrates and a controller for controlling the EM sensor below the backlight unit.

52. (Original): The LCD device of claim 50, wherein the insulating layer is formed of an organic layer.

53. (Original): The LCD device of claim 52, wherein the organic layer includes any one of PhoyoAcryl, BenzoCycloButen BCB or Polyamide.

54. (Currently Amended): The LCD device of claim 50, wherein the EM sensor includes:
a first transparent insulating layer over ~~[[on]]~~ the insulating layer including the first coil array, wherein the first coil array is formed on ~~between the first transparent insulating layer and~~ the insulating layer; and
a second transparent insulating layer over ~~[[on]]~~ the first transparent insulating layer including the second coil array, wherein the second coil array is formed on ~~[[between]]~~ the first transparent insulating layer ~~and the second transparent insulating layer~~.

55. (Cancelled)

56. (Currently Amended): The LCD device of claim 50 ~~[[55]]~~, wherein the first open end is electrically connected to a grounding voltage.

57. (Original): The LCD device of claim 56, wherein the second open end is electrically connected to a MUX.

58. (Original): The LCD device of claim 57, wherein one of the coils is selected, and then a voltage from the MUX is applied to the selected coil.

59. (Original): The LCD device of claim 50, wherein the transparent electrode includes any one of oxide indium, oxide tin, oxide zinc, indium-tin-oxide, tin-antimony-oxide and indium-zinc-oxide.